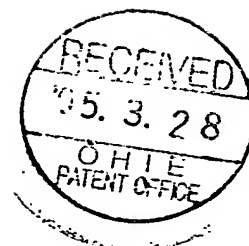


# PATENT COOPERATION TREATY



From the  
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/JP2004/018859

International filing date (day/month/year)  
10.12.2004

Priority date (day/month/year)  
30.12.2003

International Patent Classification (IPC) or both national classification and IPC  
C08F30/06, C08F230/06, C08F8/00, H01L51/30

Applicant  
SHOWA DENKO K.K.

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/JP2004/018859

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/JP2004/018859

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-15
	No: Claims	
Inventive step (IS)	Yes: Claims	1-15
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Box No. VII Certain defects in the international application**

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The following defects in the form or contents of the international application have been noted:

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/JP2004/018859

**Re Item V**

Reference is made to the following documents:

D1: EP A 1142895 (cited by the applicant)  
D2: JP A 2003113246 (" ")  
D3: EP A 1217668  
D4: JP A 2000297118

**1. Novelty (Art. 33(2) PCT)**

The subject-matter of claims 1-15 is novel in view of the prior art documents D1-D4 for the following reasons.

1.1. D1 describes similar boron compounds for light emitting devices. No polymers comprising said boron compounds as monomer units, as in the present application, are mentioned in D1.

Thus the subject-matter of claims 1-15 is novel in view of D1 (see search report).

1.2. D2 describes polymeric iridium compounds, wherein the light emitting monomer units are the same as claimed in claims 6-12. However no monomer units comprising boron compounds as claimed are disclosed in D2 (see search report).

Thus the subject-matter of claims 1-15 is novel in view of D2.

1.3. D3 and D4 relates to non polymeric boron compounds. In particular in D4 this compounds are used in OLED devices while in D3 no light emission properties are mentioned (see search report).

Thus the subject-matter of claims 1-15 is novel in view of D3 and D4.

**2. Inventive Step (Art. 33(3) PCT)**

The subject-matter of claims 1-15 involves an inventive step in view of D1-D4. The reasons as follows.

2.1. D1, which regarded as the closest prior art, describes similar boron compounds for light emitting devices. The present application differs from D1 in that said boron compounds are used as monomer units in polymeric structures in the present application illustrate the technical effect resulting from the use of the distinguishing feature above over D1. However it is clear from the examples on file that the use of the polymer comprising boron monomer units as claimed leads to polymers having good light emitting properties (high efficiency and luminascence see tables 1-2 on file).

The problem to be solved by the present invention may therefore be regarded as the preparation of a polymer having good light emitting properties.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/JP2004/018859

The solution proposed in claims 1-15 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

No hint in D1-D4 can be found to use boron compounds in monomer units as claimed in order to prepare a light emitting polymer and devices as in the present application.

In D1 and D3 no polymeric structures comprising boron monomers as claimed are mentioned, in D2 no boron compounds are involved, in D4 the boron compounds as monomer units are different and used in a different field.

Therefore the subject-matter of claims 1-15 is inventive in view of D1-D4.

**3. The subject-matter of claims 1-15 meets the requirements of Article 33(4) PCT, with regard to industrial applicability.**

**Re Item VII**

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D3 is not mentioned in the description, nor is this document identified therein.

**Re Item VIII (Art. 6 PCT)**

1. In claim 3 the part between brackets is not limiting the claim, rendering the same unclear.
2. In claim 4, 5 the expression "as defined in above 2" does not clearly indicate whether it refers to the formula 2 or to the claim 2.